

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Claims:

1.- 38. (Cancelled)

39. (Cancelled)

40. (Currently Amended) The method of claim ~~39~~ 41 wherein the consolidating material has a viscosity of less than about 100 cP.

41. (Currently Amended) ~~The method of claim 39 wherein the consolidating material comprises~~ A method of drilling a well bore comprising the steps of:

_____ providing a drilling composition comprising a drilling fluid and a consolidating material, the consolidating material comprising

_____ a hardenable resin component that comprises a hardenable resin, and

_____ a liquid hardening agent component that comprises a hardening agent, a silane coupling agent, and a surfactant; and

using the drilling composition to drill at least a portion of the well bore and allowing the consolidating material in the drilling composition to penetrate into the walls of the well bore.

42. (Previously Presented) The method of claim 41 wherein the hardenable resin in the hardenable resin component is an organic resin selected from the group consisting of bisphenol A-epichlorohydrin resins, polyepoxide resins, novolak resins, polyester resins, phenol-aldehyde resins, urea-aldehyde resins, furan resins, urethane resins, glycidyl ethers, and mixtures thereof.

43. (Previously Presented) The method of claim 41 wherein the hardening agent in the liquid hardening agent component is selected from the group consisting of amines, aromatic amines, aliphatic amines, cyclo-aliphatic amines, piperidine, triethylamine, benzyldimethylamine, N,N-dimethylaminopyridine, 2-(N₂N-dimethylaminomethyl)phenol, tris(dimethylaminomethyl)phenol, and mixtures thereof.

44. (Previously Presented) The method of claim 41 wherein the silane coupling agent in the liquid hardening agent component is selected from the group consisting of N-2-(aminoethyl)-3-aminopropyltrimethoxysilane, 3-glycidoxypropyltrimethoxysilane, n-beta-(aminoethyl)-gamma-aminopropyl trimethoxysilane and mixtures thereof.

45. (Previously Presented) The method of claim 41 wherein the surfactant in the liquid hardening agent component is selected from the group consisting of ethoxylated nonyl phenol phosphate esters, mixtures of one or more cationic surfactants, C₁₂ – C₂₂ alkyl phosphonate surfactants, mixtures of one or more non-ionic surfactants and alkyl phosphonate surfactants, and mixtures thereof.

46. (Previously Presented) The method of claim 41 wherein the hardenable resin is a furan-based resin is selected from the group consisting of furfuryl alcohol, mixtures of furfuryl alcohol with aldehydes, mixtures of furan resin and phenolic resin, and mixtures thereof.

47. (Currently Amended) The method of claim 41 ~~wherein~~ wherein the hardenable resin component further comprises a solvent selected from the group consisting of 2-butoxy ethanol, butyl acetate, furfuryl acetate, and mixtures thereof.

48. (Currently Amended) The method of claim ~~39~~ 41 wherein the consolidating material ~~is further comprises~~ a phenolic-based resin is selected from the group consisting of terpolymers of phenol, phenolic formaldehyde resin, mixtures of phenolic and furan resin, and mixtures thereof.

49. (Previously Presented) The method of claim 48 wherein the consolidating material further comprises a solvent selected from the group consisting of butyl acetate, butyl lactate, furfuryl acetate, 2-butoxy ethanol, and mixtures thereof.

50. (Currently Amended) The method of claim ~~39~~ 41 wherein the consolidating material ~~is further comprises~~ a HT an epoxy-based resin selected from the group consisting of bisphenol A-epichlorohydrin resins, polyepoxide resins, novolac resins, polyester resins, glycidyl ethers, and mixtures thereof.

51. (Previously Presented) The method of claim 50 wherein the consolidating material further comprises a solvent selected from the group consisting of dimethyl sulfoxide, dimethyl formamide, dipropylene glycol methyl ether, dipropylene glycol dimethyl ether, dimethyl formamide, diethylene glycol methyl ether, ethylene glycol butyl ether, diethylene glycol butyl ether, propylene carbonate, d-limonene, fatty acid methyl esters, and mixtures thereof.

52. (Previously Presented) The method of claim 41 wherein the consolidating material comprises:

from about 5% to about 30% phenol;

from about 40% to about 70% phenol formaldehyde;

from about 10 to about 40% furfuryl alcohol;
from about 0.1% to about 3% of a silane coupling agent; and
from about 1% to about 15% of a surfactant.

53. (Previously Presented) The method of claim 52 wherein the consolidating material further comprises a solvent selected from the group consisting of 2-butoxy ethanol, butyl acetate, furfuryl acetate, and combinations thereof.

54. (Currently Amended) The method of claim ~~39~~ 41 wherein the fluid component of the drilling fluid is an aqueous gel or an emulsion.

55. (Currently Amended) The method of claim ~~39~~ 41 wherein the consolidating material penetrates into the walls of the well bore from about 0.1 to about 3 inches.

56. (Currently Amended) The method of claim ~~39~~ 41 wherein the drilling composition further comprises a fluid loss control material.

57. (Previously Presented) The method of claim 56 wherein the fluid loss control material is selected from the group consisting of aliphatic polyesters, polylactic acid, poly(lactides), and combinations thereof.

58. (Currently Amended) A method of consolidating formation particulates surrounding a well bore comprising the steps of:

providing a drilling composition comprising a drilling fluid and a consolidating material; and

using the drilling composition to drill at least a portion of the well bore; ~~and~~

allowing the consolidating material in the drilling composition to penetrate into the walls of the well bore; and

allowing the consolidating material in the drilling composition to consolidate at least a portion of the formation particulates surrounding the well bore.

59. (Previously Presented) The method of claim 58 wherein the consolidating material has a viscosity of less than about 100 cP.

60. (Previously Presented) The method of claim 58 wherein the consolidating material comprises

a hardenable resin component that comprises a hardenable resin, and

a liquid hardening agent component that comprises a hardening agent, a silane coupling agent, and a surfactant.

61. (Previously Presented) The method of claim 60 wherein the hardenable resin in the hardenable resin component is an organic resin selected from the group consisting of bisphenol A-epichlorohydrin resins, polyepoxide resins, novolak resins, polyester resins, phenol-aldehyde resins, urea-aldehyde resins, furan resins, urethane resins, glycidyl ethers, and mixtures thereof.

62. (Previously Presented) The method of claim 60 wherein the hardening agent in the liquid hardening agent component is selected from the group consisting of amines, aromatic amines, aliphatic amines, cyclo-aliphatic amines, piperidine, triethylamine, benzyldimethylamine, N,N-dimethylaminopyridine, 2-(N₂N-dimethylaminomethyl)phenol, tris(dimethylaminomethyl)phenol, and mixtures thereof.

63. (Previously Presented) The method of claim 60 wherein the silane coupling agent in the liquid hardening agent component is selected from the group consisting of N-2-(aminoethyl)-3-aminopropyltrimethoxysilane, 3-glycidoxypropyltrimethoxysilane, n-beta-(aminoethyl)-gamma-aminopropyl trimethoxysilane, and mixtures thereof.

64. (Previously Presented) The method of claim 60 wherein the surfactant in the liquid hardening agent component is selected from the group consisting of ethoxylated nonyl phenol phosphate esters, mixtures of one or more cationic surfactants, C₁₂ – C₂₂ alkyl phosphonate surfactants, mixtures of one or more non-ionic surfactants and alkyl phosphonate surfactants, and mixtures thereof.

65. (Previously Presented) The method of claim 60 wherein the hardenable resin is a furan-based resin selected from the group consisting of furfuryl alcohol, mixtures of furfuryl alcohol with aldehydes, mixtures of furan resins and phenolic resins, and mixtures thereof.

66. (Previously Presented) The method of claim 62 wherein the hardenable resin component further comprises a solvent selected from the group consisting of 2-butoxy ethanol, butyl acetate, furfuryl acetate, and mixtures thereof.

67. (Previously Presented) The method of claim 58 wherein the consolidating material is a phenolic-based resin selected from the group consisting of terpolymers of phenol, phenolic formaldehyde resins, mixtures of phenolic and furan resins, and mixtures thereof.

68. (Previously Presented) The method of claim 67 wherein the consolidating material further comprises a solvent selected from the group consisting of butyl acetate, butyl lactate, furfuryl acetate, 2-butoxy ethanol, and mixtures thereof.

69. (Previously Presented) The method of claim 58 wherein the consolidating material is ~~a-HF~~ an epoxy-based resin selected from the group consisting of bisphenol A-epichlorohydrin resins, polyepoxide resins, novolac resins, polyester resins, glycidyl ethers, and mixtures thereof.

70. (Previously Presented) The method of claim 69 wherein the consolidating material further comprises a solvent selected from the group consisting of dimethyl sulfoxide, dimethyl formamide, dipropylene glycol methyl ether, dipropylene glycol dimethyl ether, dimethyl formamide, diethylene glycol methyl ether, ethylene glycol butyl ether, diethylene glycol butyl ether, propylene carbonate, d-limonene, fatty acid methyl esters, and mixtures thereof.

71. (Previously Presented) The method of claim 60 wherein the consolidating material comprises:

- from about 5% to about 30% phenol;
- from about 40% to about 70% phenol formaldehyde;
- from about 10 to about 40% furfuryl alcohol;
- from about 0.1% to about 3% of a silane coupling agent; and
- from about 1% to about 15% of a surfactant.

72. (Previously Presented) The method of claim 71 wherein the hardenable resin component further comprises a solvent selected from the group consisting of 2-butoxy ethanol, butyl acetate, furfuryl acetate, and combinations thereof.

73. (Currently Amended) The method of claim ~~20~~ 58 wherein the fluid component of the drilling fluid is an aqueous gel or an emulsion.

74. (Currently Amended) The method of claim ~~20~~ 58 wherein the consolidating material penetrate into the walls of the well bore from about 0.1 to about 3 inches.

75. (Currently Amended) The method of claim ~~20~~ 58 wherein the drilling composition further comprises a fluid loss control material.

76. (Currently Amended) The method of claim ~~37~~ 75 wherein the fluid loss control material is selected from the group consisting of aliphatic polyesters, polylactic acid, poly(lactides), and combinations thereof.